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U. S. Took 7 Years to Counter Red Threat With Jet Fighter

This is the third in a series of six articles based on a six-week survey by a team of New York Herald Tribune reporters documenting a serious situation in military aircraft production.

By Robert S. Bird
and Tom Lambert

The making of modern warplanes is a business of decisions. Countless thousands of them.


Bird

Even while in production the planes must be constantly improved to delay obsolescence. All the basic and most of the other critical decisions about warplanes —speed, altitude, range—are made in the Pentagon and the Air Force, and most of the manufacturer's decisions must be officially approved.

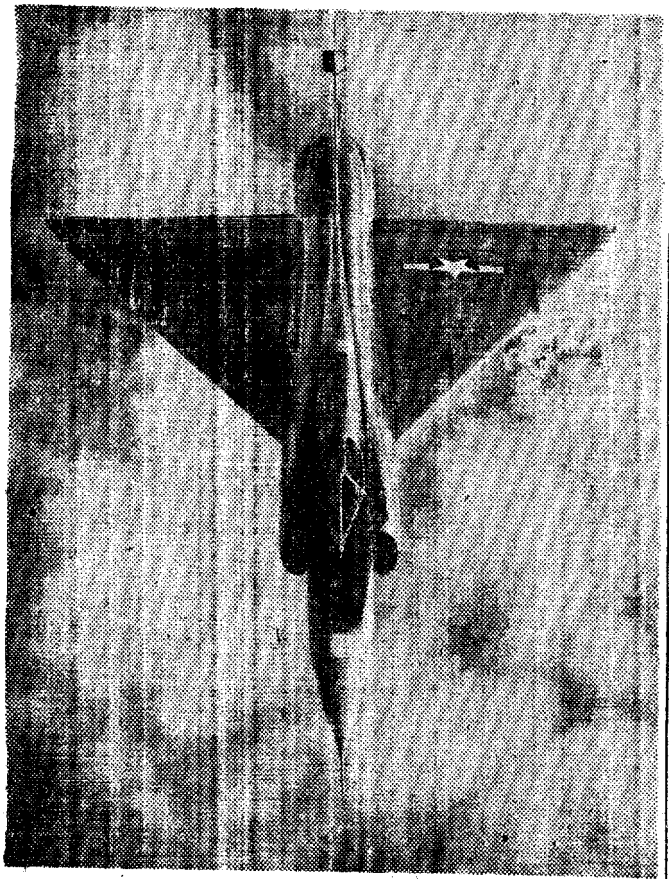
Thus the "lead time" to make a warplane, from first study to completion of the first production model, hinges to a very great extent on the quality and timeliness—especially the timeliness—of official decisions.

These set the pace for each phase of the design, development and production of the airplane, including the airframe, electronics systems and jet engine. The decisions speed or retard the whole flow of detailed manufacturing operations.

Seven years' lead time was consumed in bringing from first design to first production the F-102, this country's newest and finest supersonic all-weather fighter interceptor. There is no count of the thousands of decisions made about this plane in the seven years, or the hundreds more that will be made to improve it while it is in production during the next few years.

This big, delta wing jet fighter,

Continued on page 18, column 3


Herald Tribune—United Press

SEVEN YEARS TO PRODUCE "INTERIM" PLANE—The Convair F-102 in flight. It took seven years to bring this all-weather fighter-interceptor into production this year. It can fly at 1,000 miles an hour at altitudes over 50,000 feet. The fuselage of the delta wing jet plane is pinched in middle—a shape which solved some of the problems of supersonic flight. However, the F-102 is but an "interim" plane. In 1949 the Air Force hoped to have a "dream plane"—the F-106—in use by 1954. It is now certain that the F-106 will not be operational until 1959 at the earliest.

which can hit up to 1,000 miles an hour and can streak to altitudes over 50,000 feet, was a long time emerging, and the Air Force chiefs breathed easier this summer when it finally began moving into squadrons.

Until the F-102 materialized, this country's fighters had trouble climbing to or fighting at the altitude of 50,000 feet credited to the Soviet's high-flying, intercontinental jet bomber, the Bison.

Soviet Fighter Is Inferior

The latest known Russian all-weather fighter interceptor, the Flashlight, is inferior in performance to the F-102. The Flashlight is not believed to be supersonic or to be able to fly as high as this country's B-52 or B-47 bombers, although it probably can match their speeds.

Though the lead time to bring these Soviet fighters into production is not known for certain, there are strong evidences it was shorter than United States' lead time for fighters.

But though it took seven years to bring the F-102 into operation, it still is not the plane which the Air Force in 1949 had hoped to have by 1954.

The F-102 is an "interim" plane. The 1949 dream plane scheduled for use in 1954 may not be operational until 1959 at the earliest. That would make ten years lead time. The 1949 dream (the F-106), instead of taking to the air two years ago, may fly in prototype model later this year.

Why Lead Time Is So Long

It is the history of the "interim" F-102 that will be examined here in the framework of two major reasons outlined by aircraft producers and some top Pentagon officials to the New York Herald Tribune to explain this country's perilously long lead time in making warplanes to meet the Soviet air threat. Those reasons are:

1. It takes the Pentagon and Air Force too long to make up their minds on what kind of combat planes they want. And when they finally do reach go-ahead decisions they continue to slow action by engulfing manufacturers in red tape and excessive paper work.

takes longer to build them. (This problem doesn't seem to bother the Russian military brass too much.) Manufacturers admit they make mistakes building planes beyond the frontiers of technology, lose time correcting errors. But official indecision and red tape, they say, only lengthens already-lengthening lead time.

In the F-102 (which as yet has no popular name), both of these reasons contributed to stretching out lead time. This was dangerous, because in the same period the Soviets were making the Bison, a high-flying jet bomber which can carry the hydrogen bomb to this country.

The F-102's supersonic delta wing (a nearly perfect triangle with the base toward the tail and the apex near the needle nose) was foreshadowed in studies going back to 1930, in German reports captured in World War II and in government wind tunnel and laboratory tests in 1947.

Also, preceding the first formal studies for the F-102 proper, an experimental delta wing research plane was built from which, in an aerodynamic sense, the F-102 was largely derived.

For the sake of convenience, this research plane and the F-102 are considered in arbitrarily selected time spans. Both research plane and the F-102 were projects assigned to Consolidated Vultee Aircraft Corp., which in 1952 became the Convair division of General Dynamics Corp.

FIRST TIME SPAN (fifty-six months):—In April, 1946, the (then) Army Air Force asked Convair to design a high-speed interceptor with a delta wing. It was to be used for aerodynamic studies and would not include weapons. Designated the XF-92, the research plane was built and made its first flight on Sept. 18, 1948. Extensive test information was studied by the Air Force and other agencies through 1950, when a decision was made to go ahead with the new airplane that became the present F-102.

SECOND TIME SPAN (fifteen months):—The Air Force invited aircraft companies to submit designs for the new plane and in January, 1951, several manufacturers entered their suggestions.

Some aircraft company executives, including Gen. Joseph T. McNary (U. S. A. F., Ret.), president of Convair, told the Herald Tribune that such design competitions are one of the unnecessary time-consuming procedures in getting out urgently-needed combat planes.

Convair to start design on the airplane. And here again lead time lengthened. Numerous boards, committees, report groups and individuals scrutinized each step of the F-102 program under the Pentagon "system" for such procedure, a process which leads to delay because it is so difficult to obtain unanimity of view from all the participants.

Fifteen months elapsed before authorization came in March, 1952, to built an F-102 prototype.

THIRD TIME SPAN (thirty-three months): The Air Force had developed a logical, new concept for this plane. It was to be a "weapons system," in which the supersonic airframe, jet engine and almost entirely automatic assembly of radar, fire-control apparatus and missiles were "married" to each other from the very start of the design.

The Hughes Airplane Co. was to make the electronics systems and the six-foot-long Falcon guided missiles for the F-102. Pratt & Whitney was to provide the J-57 jet engine with about 10,000 pounds thrust. Convair as prime contractor and airframe manufacturer, was to see that all these elements meshed together as precisely as possible.

Up to this time, no combat plane had been so designed from the beginning. One result was that the F-102 ended up as the "densest" plane ever built: the most-tightly-packed-for-its-size of any aircraft. The "fit" of the components is literally "skin tight"—with the thickness of the airframe's aluminum hide held in many places to five or ten one-thousandths of an inch.

Another recent Air Force concept also entered the picture here. Under [illegible] only a couple of [illegible] were ordered, then flight-tested extensively, perhaps for two years, before production was speeded up. That method, of course, greatly stretched out lead time. On the F-102, the Air Force tried the so-called Cook-Craigie plan—ordering a larger number of early models on which more testing could be done more quickly.

This called for earlier tooling in the aircraft plant, highly desirable from a lead time viewpoint but not without risk that the plane to be made may turn out to be a failure. The Russians take this risk in their effort to surpass this country in advanced-type planes.

It turned out in the case of the F-102 that the first fourteen production planes were, in fact, "dogs." They failed to meet one of the F-102 requirements.

The F-102 production contract

[illegible] months, while the prototype was being hastened to completion, production tooling and production was started on planes scheduled for operational service.

In October, 1953, the F-102 prototype took to the air. It would not go through the sonic barrier as it was supposed to do.

This was a tremendous setback to the engineers, to Convair, to the Air Force. Convair says it had miscalculated the performance of the jet engine which was to have pushed the plane beyond the speed of sound—the point at which air streams and shock waves cause erratic behavior which was imperfectly understood then and not fully understood now.

But the problems of supersonic flight were under intensive [illegible] and in [illegible] the government's National Advisory Committee for Aeronautics had made a tremendously important technological discovery. Through wind tunnel and other tests, a mathematical formula known as the "areas rule" gave engineers new knowledge of how to fashion supersonic shapes.

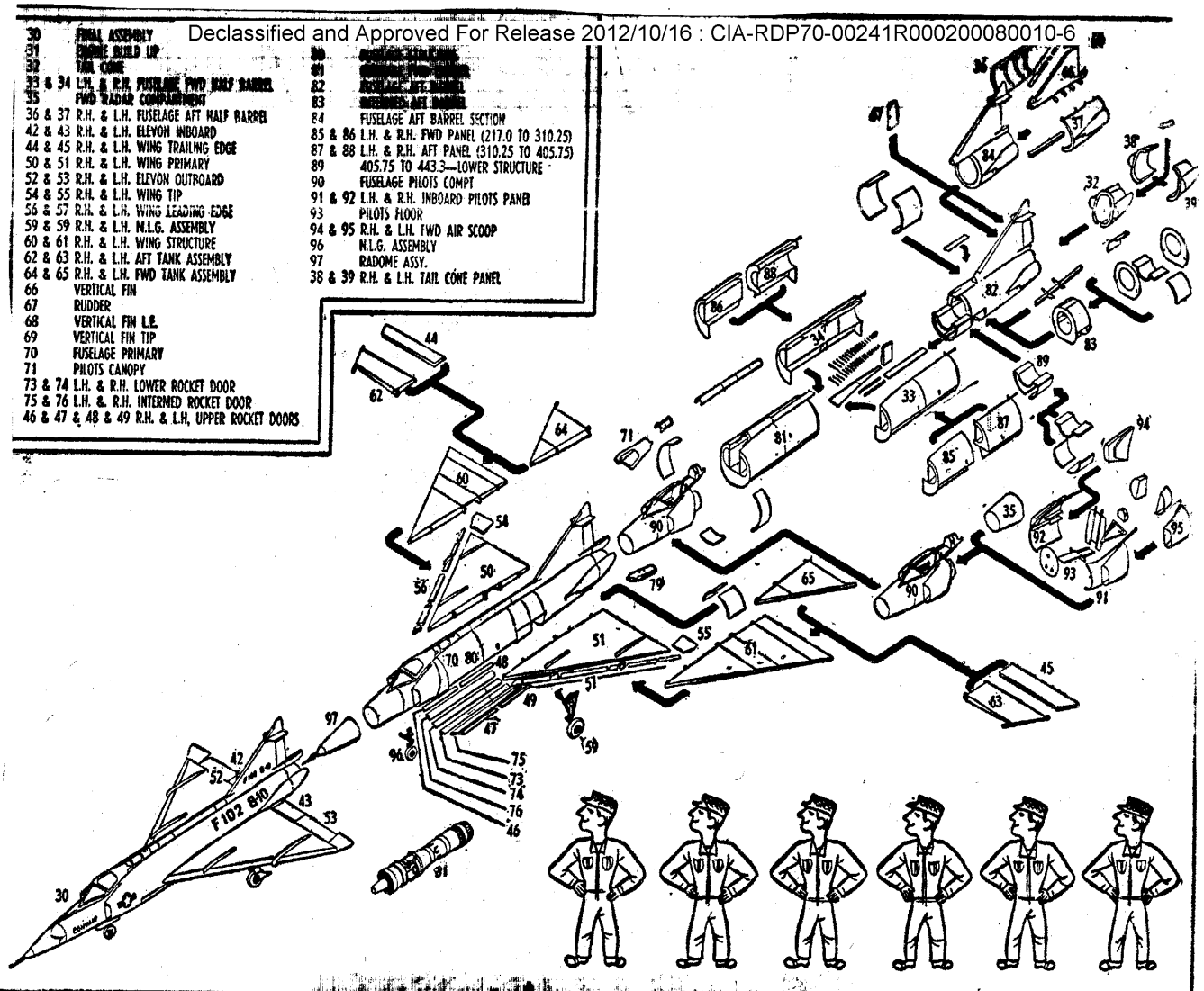
The F-102 was re-designed, with the "area rule" which pinches the fuselage waist in "Coke bottle" style. Certain that this new shape would solve the F-102's troubles, Convair in April, 1954, started up a new production line. By December, the new model F-102 was zooming past the sound barrier even [illegible]. Production rates [illegible] numbers of F-102s in [illegible] are secret but it is estimated we have over 200 of them and are turning out more than ten weekly.

The F-102 was late in arriving in combat units for—as the reader has seen—several different reasons: Pentagon and Air Force sluggishness in decisions, a major technological mystery, manufacturing mistakes and difficulties.

But the cold fact is, after seven years lead time the F-102 squeaked into operational use only this year, perhaps just in the nick of time.

Considering, that is, the surprise appearance in the air two years ago of the Soviet intercontinental jet carrier of the hydrogen bombs, their Bisons.

The fourth article in this series will appear tomorrow.



This is an "exploded view" drawing of [illegible] now in production in Convair's San Diego plant. The major assemblies are shown. More than 3,600 [illegible] components. These include 16.1 miles of sixty-one different sizes of wiring, enough piping and tub[illegible] two homes, and a jet engine that produces enough heat in an hour's running to keep 7,300 average-size homes [illegible] for the same period in winter weather. More than 6,000 persons (each figure equals 1,000 workers) are engaged in producing this plane today.